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# SmartLessons

*real experiences, real development*

## Creating a Market Pull for Cleaner Production

*Of the many challenges to scaling up the Cleaner Production (CP) Advisory Services program, the most difficult one relates to the market: engaging clients and building a robust pipeline of projects. In this article, we concentrate mainly on the lessons learned from IFC regions on approaches to selling CP in a highly replicable manner. Such lessons will greatly help us reduce transaction costs and time for providing CP advisory services.*

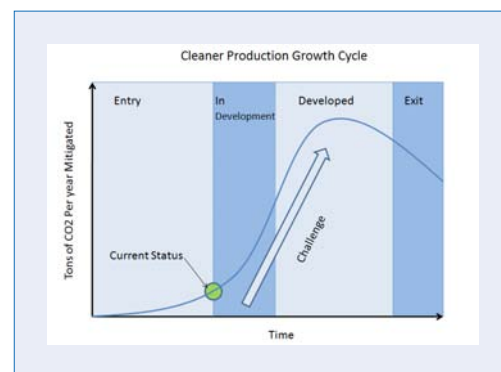
CP is an integrated strategy to maximize profits by making more efficient use of inputs (such as energy, water, and raw materials), thereby minimizing waste and pollution at the source. CP is an especially effective measure for climate change mitigation.

However, opportunities to realize cost savings and environmental benefits through CP are frequently not evident to companies in emerging markets. There is a need to provide technical expertise and create incentives for such companies to adopt CP practices. The cornerstone of the CP program is thus an audit or assessment of a client facility to identify opportunities to improve efficiency through low-cost or no-cost measures.

Originally based at IFC Headquarters (2007-2008), the program undertook 21 client facility audits along with an awareness-raising campaign for investment and advisory staff at seven international locations. A key indicator of CP's acceptance by the investment departments was the successful use of a \$20 million pilot investment facility for CP projects and IFC's approval of an additional \$125 million facility. Almost all the regions have started their own regional CP programs and are in various stages of progress on delivery capacity.

The CP programs need to develop a robust worldwide pipeline of client assessments that will lead to investments and mitigation of greenhouse gas emissions; hire well-qualified specialists in the region to help execute the program effectively; raise the awareness of investment officers so as to engage more

clients; and streamline approval and procurement procedures to reduce the period for delivery. The status of the CP programs in a typical advisory product growth cycle may be considered borderline between an "entry" and a product "in development" as indicated in the figure below.



Getting the client to say yes to a CP assessment is not an easy task. CP projects rarely rank as equals with projects to expand production or capture new markets. Benefits in the form of calculated cost-savings streams, as opposed to highly visible new production assets, appear nebulous and inherently more risky to many. Because project opportunities tend to be relatively small scale and dispersed, transaction costs can prove daunting unless mechanisms are put in place to take advantage of similarities among projects and bundle them.

There are four main approaches that the IFC regions use to sell CP:

- *Replication of technology*

- *Replication across a company with several facilities*
- *Replication across a sector with benchmarking*
- *Intervention through market players (banks, energy service companies, vendors)*

## Lessons Learned

### 1) *Replication of Technology—Lessons from Latin America and the Caribbean (CLA) and South Asia (CSA)*

In the construction materials sector, cement manufacturing is a very important subsector because it is an essential building material for society's infrastructure around the world. Cement production is energy-intensive, accounting for about 5 percent of global anthropogenic emissions of carbon dioxide, and it has an impact on a wide range of sustainability issues beyond climate change, including emissions to air and water, natural resource depletion, and employee health and safety. IFC's CLA CP team has focused on waste heat recovery from cement plants as one of its key CP program objectives.

The CLA CP team noted that only 40 to 50 percent of opportunities identified by general plant-wide audits proceed to implementation; whereas carefully focused audits on specific technologies have a much higher probability of being implemented. Further, an IFC cement industry specialist brought significant additionality to the client on waste heat recovery projects because of his knowledge of technology and the highly qualified international vendors in this field.

Cement plant waste heat recovery is increasingly of interest.  
(Courtesy: Transparent Energy Systems)



As another example, IFC's CSA CP team conducted a CP assessment of four resorts of the Universal Group in the Maldives. The assessment identified a roughly 15 percent savings in electricity consumption, a 5 percent savings in water consumption, and 5,000 tons per year of reductions in greenhouse gas emissions. IFC provided a \$2.5 million CP loan to the Universal Group to help implement the recommendations of a CP report. One technology identified in particular as replicable across all the resorts was waste heat recovery from diesel generator sets. CSA is now undertaking an initiative to replicate this heat recovery scheme across the entire resort sector in the Maldives.

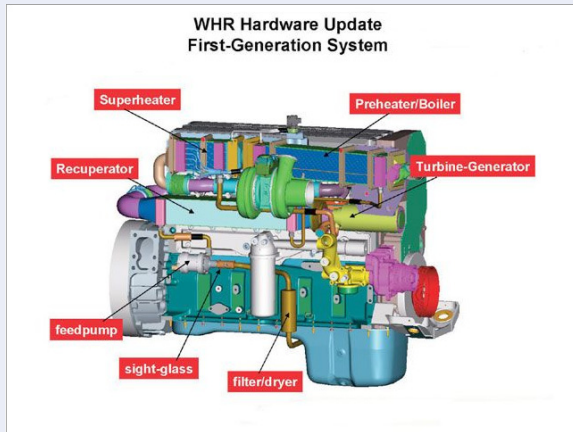
Here are five lessons learned from CLA and CSA:

- Identify a technology with high impact that can be deployed across many facilities. *A single waste heat recovery project in cement to generate power can result in 3 to 8 megawatts of electricity. There are 75 cement plants in the CLA region; and even if a third of them were outfitted with waste heat recovery, net power generation could be 125 megawatts (enough to power 125,000 US homes), assuming 5 megawatts per plant. From the opportunity identified in the Maldives, CSA has the potential to replicate it across 94 other resorts.*
- Demonstrate two or three early successes. *The CLA CP team has initiated projects at three cement plants already and has identified several more prospects for the application of cement plant waste heat recovery systems. CSA has already undertaken assessments at five resorts and plans to campaign across the entire sector.*
- Inform other similar plants about the merits. *CLA and CSA have plans to disseminate the information about these projects through workshops and conferences as soon as the first wave of projects has been completed and goes into implementation.*
- Engage local partners to spread the message. *CLA will engage the UNIDO/UNEP national CP centers in the region for the workshops and training. CSA plans to work through the local trade organization, Maldives Association of Tourism Industry.*
- Demonstrate value through credible suppliers and vendors. *CLA will introduce Japanese, Chinese, and Indian vendors in waste heat recovery technology to various cement producers in the region. CSA will work with a main engine supplier in the region.*

Based on IFC's experience, we have identified several technologies that are replicable across multiple manufacturing sites. Here are some examples:

- Biogas generation, capture, and power generation from agribusinesses. *IFC can help with effective integration of anaerobic digestion technology and combined heat and power systems.*
- Waste heat recovery projects. *These are applicable across the entire spectrum of industries, but the focus*

Waste heat recovery from diesel generator sets is widely applicable. (Courtesy Cummins)



areas for IFC could be strategic applications in the cement, metal, glass, and chemical industries.

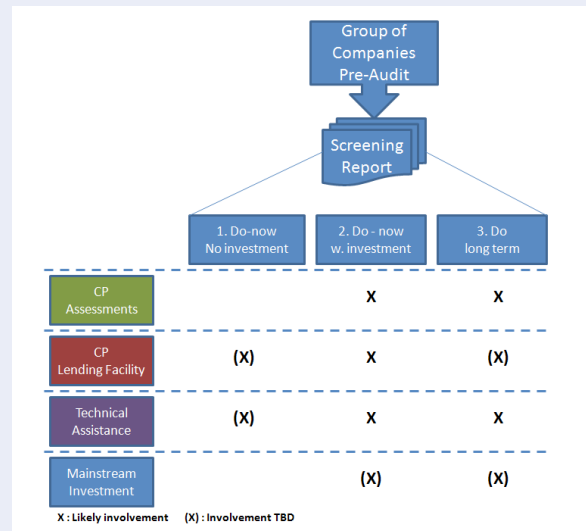
- Green building design and retrofit. *Focus areas include commercial buildings, hotels, hospitals, school buildings, retail stores, and supermarkets.*
- Process integration. *These techniques are widely applicable for improving energy and water efficiency across all the process industries, including food processing, chemicals, and refining.*
- Biomass cogeneration. *The emphasis for IFC could be on power generation from waste wood. The heat generated can be effectively used for drying wood.*
- Energy-efficient data centers. *Data centers increasingly consume a substantial portion of electricity. Technology for efficiency improvement would be widely replicable.*
- Water management emphasizing replicable technologies that involve water recycle, reuse, and savings. *There are significant opportunities in agribusiness through processing improvements and better irrigation. Other sectors of particular opportunity include forest products (pulp and paper) and buildings.*

## 2) Replication across a Company with Several Facilities—Lessons from the Middle East and North Africa (CME)

IFC's CME CP team has initiated an innovative program with a company that has nine facilities in the vicinity of Amman, Jordan. The CME program involves a package of advisory services that includes audits at five of the facilities and follow-up assistance on implementation and investments, if requested by the company. The uniqueness of the CME program is that, rather than approach each facility individually, it is more effective to target a corporation with several plants and offer it a total energy management package, as follows:

- Conduct a pre-audit to establish an overall energy program and offer a custom solution for each situation. *For the CME client, this was done for nine facilities in Jordan.*
- Conduct CP assessments where there is a potential for savings. *For the CME client, five facilities are targeted for CP assessments.*
- *Qualify eligible projects immediately for investments through the fast-track CP lending facility.*
- *Support the company in developing the capacity and expertise to sustain the energy and water efficiency initiatives on a continuous basis.*
- *Work with the company to develop a long-term energy and water sustainability plan and identify long-term financing needs (mainstream investment).*

## Cleaner production across a group of companies (Courtesy Selcuk Tanatar, IFC CME)



## 3) Replication across a Sector with Benchmarking—Lessons from Central and Eastern Europe (CEU)

The Russian foundry industry, a very energy intensive sector, comprises more than 1,200 foundries and is a major supplier to the Russian machine building industry. Starting in the 1990s, the Russian foundry industry has suffered from a general economic decline, a sharp reduction in demand for its product, and no upgrades in technology. Despite this situation, it has not been easy for IFC's CEU CP team to convince the foundries of the merits of CP and efficiency improvements.

The CEU CP team came up with an approach that is likely to be very effective. They commissioned a benchmarking study of the Russian foundry industry with the goal of transforming the entire sector. The benchmarks will enable a company to measure the gap in its operating performance compared to

best in class. CP assessments and follow-through investments will be offered to companies that are keen to identify and implement efficiency projects.

The CEU CP team benchmarking approach is as follows:

- Establish key performance indicators for cleaner production in the sector either through a comprehensive consultant survey or through public domain information if available. *In the case of the Russian foundries, the CP team undertook an intensive consultant study.*
- *Conduct workshops for factories on how to use these key performance indicators, and measure their performance against the best performers in the industry.*
- *Demonstrate to poor-performing factories how they can close the gap through one or two successful examples of companies that undertook CP assessments and implemented project recommendations.*
- *Roll out CP assessments and follow through with investments.*

A foundry in Russia (Courtesy IFC CEU).



The IFC CEU team is undertaking a similar project for the food processing sector in several subsectors such as, for example, meat processing, bakeries and pasta processing, drinks and beverages.

#### **4) Intervention through Market Players (Banks, Energy Service Companies, and Vendors)—Lessons from East Asia and Pacific (CEA)**

The China Utility-based Energy Efficiency Finance Program (CHUEE) is the best example of CP intervention through market players. CHUEE is an energy efficiency financing program, designed by IFC at the request of China's Ministry of Finance, to stimulate investment in energy efficiency and clean energy projects. The goal is to reduce emissions of greenhouse gases by creating a sustainable financing mechanism for companies to invest in energy efficiency projects. IFC cooperates with Chinese commercial

banks and offers them a facility whereby IFC shares part of the loss for all loans within the energy efficiency portfolio. The program also provides advisory services on marketing, engineering, project development, and equipment financing services to banks, project developers, and suppliers of energy efficiency products and services.

As of June 2009, the program's participating banks provided loans totaling 3.5 billion Chinese yuan (\$512 million). These loans financed 99 energy efficiency projects such as heat and gas recovery power generation and the introduction of efficient production systems. The steel, chemical, and cement industries are the largest beneficiaries. Based on engineering calculations, the Independent Evaluation Group estimates that these investments reduced greenhouse gas emissions by 14 million CO<sub>2</sub> tons per year, slightly in excess of the target set at the beginning of the program. Compared with other energy efficiency programs in China and elsewhere, the program stands out for the quick use of its guarantee facility.

Here are some key lessons from CHUEE:

- *Financial intermediaries need to be convinced about the business case for CP (energy efficiency and renewable energy).*
- *Domain knowledge in CP is an effective marketing tool.*
- *Leveraging domain knowledge and technical advisory capabilities is key to realizing projects.*
- *Simplifying/standardizing eligibility criteria provides greater reach and better monitoring.*

#### **5) Lessons from the European Bank for Reconstruction and Development (EBRD) and the U.S. Department of Energy (DOE)**

In 2008, EBRD helped to save more than 8 million tons of carbon dioxide emissions. This equates to the carbon emissions from a 3,000 megawatt gas-fueled power plant supplying the household electricity needs of half of the population of Ukraine.

Here are some lessons from the EBRD experience:

- *Focus on high-impact sectors. EBRD concentrates on power and heavy industries.*
- *Concentrate on specific technologies. EBRD looks at upgrades or introduction of measurement and control systems, waste heat recovery, electrical motors and transformers, space heating and lighting, and combined heat and power generation.*
- *Screen all investment projects. EBRD's energy team screens all EBRD investment projects at an early stage of the project cycle for their energy efficiency potential. If there is potential for improvement, a follow-up questionnaire and a site visit are scheduled, after*

which a detailed assessment is facilitated by EBRD.

- *Embed the CP technical specialists into the investment teams. EBRD's CP advisory experts and investment officers work closely and are part of one organizational unit.*
- *Offer assessments free of charge to clients.*

One of the most successful national programs for the audits is DOE's Save Energy Now program. Since 2006, more than 2,300 small, medium, and large companies have participated in the program, with average potential energy savings of 8 percent of the annual energy cost and potential avoidance of 11.2 million tons of carbon dioxide emissions. Here are some lessons from the Save Energy Now assessments:

- *Keep the assessments to a week or less. DOE assessments are by necessity very focused.*
- *Include a training element to the assessments. DOE assessments focus on hands-on demonstrations to industrial plant personnel specifically on how to use the DOE software tools. USDOE also conducts extensive countrywide workshops to train and certify consultants.*
- *Use the best and most experienced consultants. The DOE assessments are performed by a specially trained and certified cadre of consultants.*
- *Focus on specific, universally applicable technologies. DOE focuses on steam, process heating, pumps, compressed air, and fans.*
- *Offer assessments free of charge to reduce the transaction costs.*
- *Build a pipeline of interested companies through a quick Web portal sign-up process.*

## Conclusion

To create a market pull for CP assessments and subsequent investments in greenhouse gas emissions reduction projects, it is important to conceive of a project replication strategy early in the program and draw on the lessons learned in the IFC regions. The approach to building a pipeline may be based on replication of technology across the industry, targeting a company with multi-site potential, using benchmarks across a sector, or using banks and other intermediaries for aggregation of opportunities.



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